

What is claimed is:

1. An ink-jet recording sheet comprising a substrate having thereon a porous layer formed by a process comprising the steps of:

(a) coating on the substrate an aqueous coating composition containing a hydrophilic binder and inorganic particles to form the porous layer;

(b) drying the porous layer over a period, wherein the period comprises at least a constant drying rate period and a falling drying rate period; and

(c) incorporating a solution containing an additive into the porous layer after the completion of the constant drying rate period.

2. The ink-jet recording sheet of claim 1, wherein the incorporation of the solution containing an additive into the porous layer is carried out before a drying end point.

3. The ink-jet recording sheet of claim 2, wherein the incorporation of the solution containing an additive into the porous layer is carried out in the same coating line used for coating the aqueous coating composition to form the porous

layer after the moment when the volume content of water in the porous layer is less than the void volume of the porous layer at the drying end point.

4. The ink-jet recording sheet of claim 1, wherein the incorporation of the solution containing an additive into the porous layer is carried out at the moment when the following formula is satisfied:

$$V_{wp} + V_s \leq 1.5 V_{vp},$$

wherein V_{wp} is the volume content of water in the porous layer, V_s is the volume of the solution containing an additive and V_{vp} is the void volume of the porous layer at a drying end point.

5. The ink-jet recording sheet of claim 1, wherein the solution containing an additive comprises water or a mixture of water and an organic solvent which is miscible with water.

6. The ink-jet recording sheet of claim 1, wherein the ink-jet recording sheet is wound in a roll after the step (c) without substantially being dried.

7. The ink-jet recording sheet of claim 1, wherein the substrate is a resin coated paper comprising paper covered with a polyolefin resin on both sides of the paper.

8. The ink-jet recording sheet of claim 7, wherein the content of water in the paper is at most 8 weight % of the paper.

9. The ink-jet recording sheet of claim 7, wherein the incorporation of the solution containing an additive into the porous layer is carried out at the moment when the following formula is satisfied:

$$M_{wp} + M_{ws} \leq 0.07 M_p,$$

wherein M_{wp} is the weight content of water in the porous layer, M_{ws} is the weight content of water in the solution containing an additive, and M_p is the weight of the paper used for the substrate.

10. The ink-jet recording sheet of claim 1, wherein the additive in the solution is a surface active agent.

11. The ink-jet recording sheet of claim 1, wherein the viscosity of the solution containing an additive is at most 100 mPa·s.

12. The ink-jet recording sheet of claim 1, wherein the additive in the solution is a hardener for the hydrophilic binder.

13. The ink-jet recording sheet of claim 1, wherein the additive in the solution is an image stabilizer.

14. The ink-jet recording sheet of claim 1, wherein the additive in the solution is a water-soluble polyvalent metal compound.

15. The ink-jet recording sheet of claim 1, wherein the pH value of the solution containing an additive is from 1 to 5.

16. The ink-jet recording sheet of claim 1, wherein the pH value of the solution containing an additive is from 8 to 13.

17. A method for preparing an ink-jet recording sheet, comprising the steps of:

- (a) coating on the substrate an aqueous coating composition containing a hydrophilic binder and inorganic particles to form the porous layer;
- (b) drying the porous layer over a period, wherein the period comprises at least a constant drying rate period and a falling drying rate period; and
- (c) incorporating a solution containing an additive into the porous layer after the completion of the constant drying rate period.

18. The method for preparing the ink-jet recording sheet of claim 17, wherein the incorporation of the solution containing an additive into the porous layer is carried out before a drying end point.

19. The method for preparing the ink-jet recording sheet of claim 17, wherein the incorporation of the solution containing an additive into the porous layer is carried out in the same coating line used for coating the aqueous coating composition to form the porous layer.

20. The method for preparing the ink-jet recording sheet of claim 17, wherein the incorporation of the solution

containing an additive on the porous layer is carried out at the moment when the following formula is satisfied:

$$V_{wp} + V_s \leq 1.5 V_{vp},$$

wherein V_{wp} is the volume content of water in the porous layer, V_s is the volume of the solution containing an additive and V_{vp} is the void volume of the porous layer at a drying end point.

21. The method for preparing the ink-jet recording sheet of claim 17, wherein the solution containing an additive comprises water or a mixture of water and an organic solvent which is miscible with water.

22. The method for preparing the ink-jet recording sheet of claim 17, wherein the ink-jet recording sheet is wound in a roll after the step (c) without substantially drying.

23. The method for preparing the ink-jet recording sheet of claim 17, wherein the substrate is a resin coated paper comprising paper covered with a polyolefin resin on both sides of the paper.

24. The method for preparing the ink-jet recording sheet of claim 23, wherein the content of water in the paper is at most 8 weight % of the paper.

25. The method for preparing the ink-jet recording sheet of claim 23, wherein the incorporation of the solution containing an additive on the porous layer is carried out at the moment when the following formula is satisfied:

$$M_{wp} + M_{ws} \leq 0.07 M_p,$$

wherein M_{wp} is the weight content of water in the porous layer, M_{ws} is the weight content of water in the solution containing an additive, and M_p is the weight of the paper used for the substrate.

26. The method for preparing the ink-jet recording sheet of claim 17, wherein the additive in the solution is a surface active agent.

27. The method for preparing the ink-jet recording sheet of claim 17, wherein the viscosity of the solution containing an additive is at most 100 mPa·s.

28. The method for preparing the ink-jet recording sheet of claim 17, wherein the additive of the solution is a hardener for the hydrophilic binder.

29. The method for preparing the ink-jet recording sheet of claim 17, wherein the additive in the solution is an image stabilizer.

30. The method for preparing the ink-jet recording sheet of claim 17, wherein the additive in the solution is a water-soluble polyvalent metal compound.

31. The method for preparing the ink-jet recording sheet of claim 17, wherein the pH value of the solution containing an additive is from 1 to 5.

32. The method for preparing the ink-jet recording sheet of claim 17, wherein the pH value of the solution containing an additive is from 8 to 13.